**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Geometry, Mrs. Sulkes**

**December 3rd, 2012**

**4-7 Theorems Related to Perpendicular Bisector of a Segment**

**Perpendicular Bisector Theorem (theorem 4:5):** If a point lies on the perpendicular bisector of a segment, then the point is equidistant from the endpoints of the segment.

Proof:

Given: Line *l* is the perpendicular bisector of segment BC and A is on *l*

Prove: AB = AC

**Converse of Perpendicular Bisector Theorem: (Theorem 4 – 6)**  If a point is equidistant from the endpoints of a segment, then the point lies on the perpendicular bisector of the segment.

Given: AB = AC

Prove: A is on the perpendicular bisector of segment BC.

**Theorems 4-7 –** If a point lies on the bisector of an angle, then the point is equidistant from the sides of the angle.

Proof:

Given: Ray BZ bisects <ABC, P lies on ray BZ, segments PX and PY are perpendicular to the sides of <ABC

Prove: PX = PY

**Converse:**

**Theorem 4-8** - If a point is equidistant from the sides of an angle, then the point lies on the bisector of the angle.

Shortcut:

Given: PX = PY, segments PX and PY are perpendicular to the sides of <ABC

Prove: Ray BP bisects <ABC